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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/811,980

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Yoshinobu Hirokado

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EXAMINER

HO, ALLEN C

ART UNIT

PAPER NUMBER

2882

NOTIFICATION DATE

DELIVERY MODE

06/28/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/811,980

Applicant(s)

HIROKADO, YOSHINOBU

Examiner

Allen C. Ho

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9 and 11 is/are rejected.
- 7) ☒ Claim(s) 3 and 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 2-10 are objected to because of the following informalities:

Claims 2-10 recite the limitation "first electrodes" and "second electrodes". There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi *et al.* (U. S. Patent No. 5,955,850) in view of Kawate *et al.* (U. S. Patent No. 7,012,362 B2).

With regard to claims 1 and 11, Yamaguchi *et al.* disclosed a cold cathode light emitting device that comprises: a plurality of cathode electrodes (**2, 102**); a plurality of insulating layers (**3, 3', 103, 103'**) laminated over the plurality of cathode electrodes; a plurality of gate electrodes (**7**) provided on the plurality of insulating layers to intersect the plurality of cathode electrodes with the plurality of insulating layers interposed therebetween for extracting electrons from the plurality of cathode electrodes; an anode electrode (**9, 109**) opposed to the plurality of gate

Art Unit: 2882

electrodes for emitting light upon receipt of the electrons, with a voltage for accelerating the electrons being applied between the anode electrode and the plurality of cathode electrodes; at least one hole (20, 120) provided at each intersection of the plurality of cathode electrodes and the plurality of gate electrodes extending through the plurality of gate electrodes and the plurality of insulating layers to reach a surface of the plurality of cathode electrodes, the at least one hole having a first diameter (D1) at a position where a first (3, 103) of the plurality of insulating layers contact the plurality of cathode electrodes and a second diameter (2d₁, D2) at a position of the plurality of gate electrodes, where the second diameter is greater than the first diameter (Figs. 3, 22).

However, Yamaguchi *et al.* failed to disclose a nanofiber-structure layer provided on the plurality of first electrodes in an opening portion corresponding to the first diameter in the at least one hole.

Kawate *et al.* disclosed a cold cathode light emitting device that comprises a nanofiber-structure layer provided on the plurality of first electrodes. Kawate *et al.* taught that nanofiber is capable of emitting a high electron current at a low electric field (column 11, lines 32-57).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a nanofiber-structure layer on the plurality of first electrodes in an opening portion corresponding to the first diameter in the at least one hole, since a person would be motivated to employ an electron emission material that is capable of emitting a high electron current at a low electric field.

With regard to claim 2, Yamaguchi *et al.* and Kawate *et al.* disclosed the cold cathode light emitting device according to claim 1, wherein the at least one hole is divided into a first

section corresponding to a lowermost insulating layer (Yamaguchi *et al.* 3) of the plurality of insulating layers being in contact with the plurality of cathode electrodes, a second section corresponding to the remainder (Yamaguchi *et al.* 3') of the plurality of insulating layers located over the lowermost insulating layer, and a third section corresponding to the plurality of gate electrodes (Yamaguchi *et al.* 7); and the first diameter is in the first section, the second diameter is in the third section, and a third diameter is at a lower part of the second section, where the third diameter is greater than the second diameter (Fig. 3).

With regard to claim 4, Yamaguchi *et al.* and Kawate *et al.* disclosed the cold cathode light emitting device according to claim 1, wherein the at least one hole is divided into a first section corresponding to a lowermost insulating layer (Yamaguchi *et al.* 3, 103) of the plurality of insulating layers being in contact with the plurality of cathode electrodes, a second section corresponding to the remainder (Yamaguchi *et al.* 3', 103') of the plurality of insulating layers located over the lowermost insulating layer, and a third section corresponding to the plurality of gate electrodes (Yamaguchi *et al.* 7, 107); and the first diameter is in the first section, and the second section includes a constant diameter substantially equal to the second diameter throughout the second region (Figs. 3, 22).

With regard to claim 5, Yamaguchi *et al.* and Kawate *et al.* disclosed the cold cathode light emitting device according to claim 1, wherein the at least one hole is divided into a first section corresponding to a lowermost insulating layer (Yamaguchi *et al.* 3) of the plurality of insulating layers being in contact with the plurality of cathode electrodes, a second section corresponding to the remainder (Yamaguchi *et al.* 3') of the plurality of insulating layers located over the lowermost insulating layer, and a third section corresponding to the plurality of gate

Art Unit: 2882

electrodes (Yamaguchi *et al.* 7); and the first diameter is in the first section, and the second section includes a diameter that increases to flare toward the plurality of second electrodes (Fig. 4(b)).

With regard to claim 6, Yamaguchi *et al.* and Kawate *et al.* disclosed the cold cathode light emitting device according to claim 1, wherein an insulating layer (Yamaguchi *et al.* 3', 103') of the plurality of insulating layers located over a lowermost insulating layer (Yamaguchi *et al.* 3, 103) of the plurality of insulating layers being in contact with the plurality of cathode electrodes has the same pattern configuration (holes overlap) as the plurality of gate electrodes.

With regard to claim 7, Yamaguchi *et al.* and Kawate *et al.* disclosed the cold cathode light emitting device according to claim 1, wherein a lowermost insulating layer (Yamaguchi *et al.* 3, 103) of the plurality of insulating layers being in contact with the plurality of cathode electrodes is a deposited insulating layer in which insulative films are deposited. Note: This claim is treated as a product-by-process claim. MPEP § 2113.

With regard to claim 8, Yamaguchi *et al.* and Kawate *et al.* disclosed the cold cathode light emitting device according to claim 1, wherein a lowermost insulating layer (Yamaguchi *et al.* 3, 103) of the plurality of insulating layers being in contact with the plurality of first electrodes is formed by firing a paste material made of resin containing glass powder dispersed therein. Note: This claim is treated as a product-by-process claim. MPEP § 2113.

With regard to claim 9, Yamaguchi *et al.* and Kawate *et al.* disclosed the cold cathode light emitting device according to claim 1. Although Yamaguchi *et al.* disclosed a thickness t_1 (L_1) of a lowermost insulating layer of the plurality of insulating layers being in contact with the plurality of cathode electrodes and a thickness t_2 (L_2) of the remainder of the plurality of

insulating layers (column 7, lines 38-41), Yamaguchi *et al.* failed to disclose a t_1 that is smaller than t_2 . Yamaguchi *et al.* further taught designing an electric field by adjusting various parameters (column 7, line 65 - column 8, line 9).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to configure the thickness of the lowermost insulating layer such that it is smaller than the thickness of the remainder of the plurality of insulating layers, since a person would be motivated to design a desired electric field by adjusting various parameters.

Allowable Subject Matter

4. Claims 3 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
5. Claim 18 is allowed.

Response to Amendment

6. Applicant's amendments filed 09 May 2007 with respect to claims 12-17 have been fully considered and are persuasive. The objection of claims 12-17 has been withdrawn.
7. Applicant's amendments filed 09 May 2007 with respect to the rejection(s) of claim(s) 1, 2, 5-9, and 11 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Yamaguchi *et al.* (U. S. Patent No. 5,955,850).

Response to Arguments

8. Applicant's arguments filed 09 May 2007 with respect to claims 2-5 have been fully considered and are persuasive. The objection of claims 2-5 has been withdrawn.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- (1) Lee *et al.* (U. S. Patent No. 7,056,753 B2) disclosed a field emission display that comprises a plurality of insulating layers (131, 132) between cathode electrode (120) and gate electrode (160).
- (2) Perrin *et al.* (U. S. Patent No. 6,534,913 B1) disclosed a field emission display that comprises a plurality of insulating layers (53, 55) between cathode electrode (51) and gate electrode (58).
- (3) Okita *et al.* (U. S. Patent No. 6,489,710 B1) disclosed a field emission display.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2882

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allen C. Ho/
Primary Examiner
Art Unit 2882

22 June 2007